

### REMARKS/ARGUMENTS

The above-identified patent application has been reviewed in light of the Examiner's Action dated December 3, 2002. In the amendments set forth above, Claim 1 has been amended without intending to abandon or to dedicate to the public any patentable subject matter, and without narrowing the claim, Claims 37-39 are new, and no claims have been canceled. Accordingly, Claims 1-8 and 37-39 are now pending. As set out more fully below, reconsideration and withdrawal of the rejections of the claims are respectfully requested.

Claims 1-8 stand rejected under 35 U.S.C. §103 as being unpatentable over U.S. Patent No. 5,485,787 to Bowcutt et al. ("Bowcutt"). In order to establish a *prima facie* case of obviousness under 35 U.S.C. §103, there must be some suggestion or motivation to modify the reference, there must be a reasonable expectation of success, and the prior art reference must teach or suggest all of the claim limitations. (MPEP §2143). It is submitted that a *prima facie* case to reject Claims 1-8 has not been established.

Bowcutt fails to teach or suggest at least the following italicized features of Claim 1 and newly added Claim 40:

1. A system for launching a projectile to remove a body of rock in an excavation, comprising:  
a projectile that includes:  
a nose, *the nose being one of substantially flat and concave to inhibit deflection of the projectile from a face of the rock;*  
a body containing an explosive charge; and  
a tail having a plurality of fins to control the trajectory of the projectile; and  
a tube for launching the projectile, *wherein the nose is the one of substantially flat and concave after launch from the tube and a center of gravity of the projectile is located in the body and a center of pressure of the projectile is located in the tail.*

40. A system for launching a projectile to remove a body of rock in an excavation, comprising:  
projectile means for removing the body of rock that includes:

nose means for contacting the body of rock, *the nose means being one of substantially flat and concave to inhibit deflection of the projectile means from a face of the rock;*

body means for containing an explosive charge; and

tail means having a plurality of fins for controlling the trajectory of the projectile means; and

tube means for launching the projectile, *wherein the nose means is the one of substantially flat and concave after launch from the tube means.*

Accordingly, for at least this reason, Claims 1-7 and 37-49 are not obvious in view of Bowcutt.

The Bowcutt reference is generally directed to a gas gun launched scramjet test projectile. The test projectile discussed by Bowcutt is designed to travel at velocities greater than Mach 5. The projectile is propulsion-assisted and is used to enable the simulation of flow physics and the acquisition of performance data that correlates directly to those of a scramjet powered vehicle. (Bowcutt, col. 4, lns. 5-7). Accordingly, the projectile discussed by Bowcutt is concerned with the integration of the air frame and propulsion systems for vehicles or projectiles traveling at supersonic and hypersonic speeds. (See Bowcutt, col. 1, lns. 27-30). The projectile illustrated by Bowcutt includes a nose cap 101 secured to the forebody 102 to form an external surface that extends from the projectile nose tip 103 rearwardly to the vicinity of the leading edge of the cowl 110. (Bowcutt, col. 5, lns. 5-9).

Because the projectile 100 is intended to travel at velocities greater than Mach 5 (Bowcutt Abstract, Claim 1), and because parameters that include the forebody and inlet contraction ratios, the inlet efficiency, etc., impacts the performance of ramjet and scramjet systems (Bowcutt, col. 1, ln. 65 to col. 2, ln. 3), there is no teaching, suggestion or disclosure of a substantially flat or concave nose as recited by the pending claims. In addition, because removal of the nose 101 would foreshorten the compression surface S and leave an unfinished threaded portion T, Bowcutt cannot be understood as teaching, suggesting or disclosing operation of that reference's projectile without the tip 101. (Bowcutt, col. 4, ln. 63 to col. 5, ln. 9; Fig. 1). Furthermore, because Bowcutt is concerned with propelling a projectile at velocities of greater than Mach 5, Bowcutt teaches away

from a projectile with a nose that is substantially flat or concave, or a nose that is adapted to inhibit deflection of the projectile from a face of rock in an excavation.

Although Bowcutt appears to teach that the center of gravity is located in the body of the projectile, the short tail would cause the center of pressure also to be located in the projectile body. In contrast, the projectile of the present invention uses an elongated tail relative to the projectile body to establish this offset relationship.

In the Office Action, the Examiner states that “the intended use of the claimed invention is not given patentable weight. . . “ Applicant disagrees.

MPEP§2114 states “[w]hile features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function” and [a] claim containing a ‘recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus’ if the prior art apparatus teaches all the structural limitations of the claim.”

Independent Claim 1 requires that “ the nose is the one of substantially flat and concave after launch from the tube” and Claim 40 that “ the nose means is the one of substantially flat and concave after launch from the tube means.” The intended use of the invention is thus not the issue. The claim simply requires the nose to be substantially flat or concave *after* the projectile is fired. This is a *structural* distinction. Bowcutt teaches the opposite, namely that the brass nosecone 101 be mounted on the front of the projectile after the projectile is fired for the reasons noted above. Moreover, new Claim 40 is a means plus function claim which, by its nature, is stated in functional language.

For the reasons set forth above, the Bowcutt reference does not teach, suggest or disclose a system for launching a projectile to remove a body of rock in an excavation as claimed. Furthermore, the Bowcutt reference teaches away from specific structural aspects of the claimed system. Accordingly, the rejections of Claims 1-8 should be reconsidered and withdrawn.

The amended and new dependent claims provide further reasons for allowance.

By way of example, dependent Claim 2 is directed to a detonating device having a primer in a proximal end and a striker in a distal end, the striker and primer being separated from one another by a spring member which forces the striker away from the primer and a safety pin which restricts the motion of the striker towards the primer. The detonating device is located in a pocket in the projectile, the pocket having at least one of a length and width that exceeds a corresponding one of a length and width of the detonating device, thereby permitting at least one of longitudinal and latitudinal motion of the detonating device in the pocket in response to movement of the projectile. (See new Claim 42.)

Dependent Claim 3 is directed to the outer diameter of the body being no less than about 25% and no more than about 100% of the outer diameter of the tail. (See new Claim 43.)

Dependent Claim 4 is directed to the length of the tail being at least about 60% of the total length of the projectile. (See new Claim 44.)

Dependent Claim 5 is directed to a gap between a sidewall of the detonating device and a sidewall of the pocket ranging from about 0.5 to about 4.0 mm. (See new Claim 45.)

Dependent Claim 6 is directed to a gap existing between an inner wall of the pocket and an outer wall of the detonating device, and the gap ranging from about 0.5 to about 4.0 mm. (See new Claim 46.)

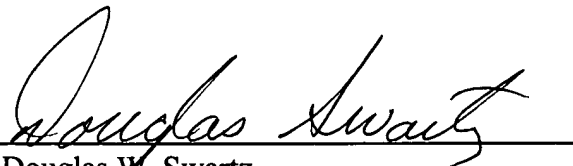
Dependent Claim 7 is directed to a distal end of the detonating device having a larger outer diameter than a proximal end of the detonating device such that the proximal end of the detonating device can be received along substantially the entire length of the pocket and the distal end of the detonating device cannot be received along substantially the entire length of the pocket. (See new Claim 47.)

Based upon the foregoing, Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

*Application No. 10/005,797*  
*Reply to Office Action of Apr. 20, 2004*  
*Amendment dated Sep. 20, 2004*

Respectfully submitted,

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